

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently amended) An engine unit, particularly for urban transport, comprising:

an engine (3) supplied with a compressed gas and having an expansion chamber (9) provided with a piston (6) arranged for completing cyclically a power and an exhaust stroke at each double stroke[[,]];

a liquid gas tank (28) in communication with the engine (3), and

means (M, M') for gasifying the liquid gas, which are interposed between the liquid gas tank (28) and the engine (3) for obtaining compressed gas, the gasifying means (M) comprising a gasification chamber (22) in communication with the liquid gas tank (28) and a liquid fuel tank (39) which is connected to the gasification chamber (22), ~~eharaeterised in that~~

wherein the gasification chamber (22) is in fluid communication with both the liquid fuel tank (39) for the combustion of the liquid fuel with the oxygen of the liquid gas (22), and the expansion chamber (9) so that a gas mixture comprising compressed liquid gas and gaseous products of combustion process are used to do useful work.

2. (Currently amended) An engine unit according to Claim 1, ~~characterised in that~~ wherein said expansion chamber (9) is provided with an intake valve (12) and ~~that~~ wherein a duration (AB) for opening the intake valve (12) is selected so that the gas mixture, at the end of the piston power stroke, has substantially attained ambient pressure and temperature.

3. (Currently amended) An engine unit according to Claim 1 [[or 2]], ~~characterised in that~~ wherein said expansion chamber (9) is provided with an exhaust valve (13) and that a duration (CD) for opening the exhaust valve (13) is selected so that, at the end of the

piston exhaust stroke, when the intake vale (12) has to open, substantially the same pressure as in the gasification chamber (22) prevails in the expansion chamber (9).

4. (Currently amended) An engine unit according to Claim 1, ~~characterised in that wherein~~ the gasifying means (M) comprise a heat exchanger (33) between the liquid gas tank (28) and the gasification chamber (22), for a starting gasification of the liquid gas.

5. (Currently amended) An engine unit according to Claim 1 [[or 4]], ~~characterised in that wherein~~ the liquid gas is of liquid air or of air depleted of oxygen.

6. (Currently amended) An engine unit according to Claim 1 [[or 4]], ~~characterised in that wherein~~ the liquid gas is liquid nitrogen.

7. (Currently amended) An engine unit according to Claim[[s]] 6, ~~characterised in that wherein~~ the gasifying means (M) comprise an oxygen tank (128) in communication with the gasification chamber (22) for combustion of the liquid fuel.

8. (Currently amended) An engine unit according to Claim 1, ~~characterised in that wherein~~ the liquid fuel is liquid hydrogen.

9. (Currently amended) An engine unit according to Claim 1, ~~characterised in that wherein~~ the gasifying means (M) comprise a pilot igniter (50,64) inside the gasification chamber (22) to promote the combustion.

10. (Currently amended) An engine unit according to Claim 1, ~~characterised in that wherein~~ the gasifying means (M) comprise a pump (31) between the liquid gas tank (28) and the gasification chamber (22).

11. (Currently amended) An engine unit according to Claim 1, ~~characterised in that it comprises further comprising~~ a pump (42,56) between the liquid fuel tank (39) and the gasification chamber (22).

12. (Currently amended) An engine unit according to Claim 7, ~~characterised in that it comprises further comprising~~ a pump (131) between the oxygen tank (128) and the gasification chamber (22).

13. (Currently amended) An engine unit according to Claim[[s]] 10, 11 and 12, ~~characterised in wherein~~ that the pump[[s]] (31,42, 56,131) are is a variable delivery pump[[s]] used for controlling the engine (3) speed.

14. (Currently amended) An engine unit according to Claim 1, ~~characterised in that it comprises further comprising~~ a heat exchanger (44,58) between the liquid fuel tank (39) and the gasification chamber (22) for a starting gasification of the liquid fuel.

15. (Currently amended) An engine unit according to Claim 1, ~~characterised in that wherein~~ the gasification chamber (22) is split into a first gasification chamber (26) and a second gasification chamber (27) for combustion of the liquid fuel with the oxygen under conditions of saturated steam and overheated steam respectively.

16. (Currently amended) An engine unit according to Claim 1 [[or 4]], ~~characterised in that wherein~~ the gasification chamber is to a first gasification chamber (222,322) which is in fluid communication with an oxygen tank (128) and with the fuel tank (39) and into a second gasification chamber (227,326) which is in fluid communication with the liquid gas tank (28), the first gasification chamber (222,322) and the second gasification chamber (227,326) being under thermal exchange condition for exchanging the combustion heat produced between the oxygen and the fuel.

17. (Currently amended) An engine unit according to Claim 16, ~~characterised in that wherein~~ the first gasification chamber (222) and the second gasification chamber (227) are in fluid communication through a thermal exchange chamber (226).

18. (Currently amended) An engine unit according to Claim 16, ~~characterised in that wherein~~ the second gasification chamber (326) is directly inserted inside the first gasification chamber (322).

19. (Currently amended) An engine unit according to Claim 1, ~~characterised in that wherein~~ the engine (3) comprises an intake valve (12), which is controlled to close for a predetermined duration (AB).

20. (Currently amended) An engine unit according to Claim 1, ~~characterised in that wherein~~ the engine (3) comprises an exhaust valve (13), which is controlled to close for a predetermined duration (CD).

21. (Currently amended) A method for supplying an engine (3) particularly for urban traction, comprising the step of gasifying a liquid gas thus obtaining compressed gas, ~~characterised in that wherein~~ the gasification is achieved by combustion of a predetermined limited amount of a liquid fuel and oxygen contained in the liquid gas, so that combustion is performed in the same area where the gasification of liquid gas takes place and the engine (3) is supplied with the compressed gas and with gaseous products of combustion process.

22. (Currently amended) A method according to Claim 21, ~~characterised in that wherein~~ the gasification is achieved by a heat exchanger extracting heat from the ambient atmosphere.

23. (Currently amended) A method according to Claim 21, ~~characterised in that wherein~~ the liquid gas is of proper liquid air or liquid air depleted of oxygen, and ~~that wherein~~ the combustion is performed with oxygen of the liquid air.

24. (Currently amended) A method according to Claim 21, ~~characterised in that wherein~~ the liquid gas is of nitrogen and that the combustion is performed with oxygen autonomously supplied with respect to the liquid gas.

25. (Currently amended) A method according to Claim 21, ~~characterised in that it comprises further comprising~~ a further gasification step of the liquid gas which takes place in a distinct gasification area where the oxygen and fuel combustion is performed, and that the combustion heat is conveyed into the gasification area.

26. (Currently amended) A method according to Claim 21, ~~characterised in that wherein~~ the liquid fuel is liquid hydrogen.

27. (Currently amended) A method according to Claim 21, ~~characterised in that wherein~~ the combustion takes place in the presence of a pilot igniter.

28. (Currently amended) A method according to Claim 21, ~~characterised in that wherein~~ the predetermined limited amount of the liquid fuel is selected to obtain compressed gas at a predetermined pressure comprised between 10 and 30 atmospheres and preferably 20 atmospheres.

29. (Currently amended) A method according to Claim 21, ~~characterised in that it comprises further comprising~~ the step of performing a starting gasification of the liquid fuel in a heat exchanger (44,58).

30. (Currently amended) A generator for supplying an engine (3), particularly an engine for urban traction and the like, comprising:

a liquid gas tank (28) and

gasifying means (M,M') for gasifying the liquid gas into compressed gas, the gasifying means (M) comprising

a gasification chamber (22) in fluid communication with the liquid gas tank (29) and

a liquid fuel tank (39) which is connected to the gasification chamber (22), characterised in that

wherein the gasification chamber (22) is in fluid communication with both the liquid fuel tank (39) for combustion of the liquid fuel with the oxygen of the liquid gas, and a cylinder (5) of the engine (3) through a compressed gas intake valve (12), so that compressed liquid gas and gaseous products of combustion process are used to do useful work.

31. (Currently amended) A generator according to Claim 30, characterised in that wherein the gasifying means (M) comprise a heat exchanger (33) between the liquid gas tank (28) and the gasification chamber (22) for a starting gasification of the liquid gas.

32. (Currently amended) A generator according to Claim 31, characterised in that wherein the liquid gas is of liquid air or of liquid air depleted of oxygen.

33. (Currently amended) A generator according to Claim 30, characterised in that wherein the liquid gas is liquid nitrogen.

34. (Currently amended) A generator according to Claims 33, characterised in that wherein the gasifying means (M') comprise an oxygen tank (128) in fluid communication with the gasification chamber (22) for combustion with the liquid fuel.

35. (Currently amended) A generator according to Claim 30, ~~characterised in that wherein~~ the liquid fuel is liquid hydrogen.

36. (Currently amended) A generator according to Claim 30, ~~characterised in that wherein~~ the gasifying means (M) comprise a pilot igniter (50,64) within the gasification chamber (22) to promote the combustion.

37. (Currently amended) A generator according to Claim 31, ~~characterised in that wherein~~ the gasifying means (M) comprise a pump (31) between the liquid gas tank (28) and the gasification chamber (22).

38. (Currently amended) A generator according to Claim 31, ~~characterised in that it comprises further comprising~~ a pump (42,56) between the liquid fuel tank (39) and the gasification chamber (22).

39. (Currently amended) A generator according to Claim 34, ~~characterised in that it comprises further comprising~~ a pump (131) between the oxygen tank (128) and the gasification chamber (22).

40. (Currently amended) A generator according to Claim[[s]] 36, 38, and 39, ~~characterised in that wherein~~ the pump[[s]] (31,42,56) ~~are~~ is a variable delivery pump[[s]] for controlling the engine (3) speed.

41. (Currently amended) A generator according to Claim 31, ~~characterised in that it comprises further comprising~~ a heat exchanger (44,58) between the liquid fuel tank (39) and the gasification chamber (22) for a starting gasification of the liquid hydrogen.

42. (Currently amended) A generator according to Claim 34, ~~characterised in that wherein~~ the gasification chamber (22) is split into a first gasification chamber (26) and a second

gasification chamber (27) for combustion of the hydrogen with the oxygen of the air under conditions of saturated steam and overheated steam respectively.

43. (Currently amended) A generator according to Claim 30, ~~characterised in that wherein~~ the gasification chamber (22) is split into a first gasification chamber (222, 322), which is in communication with the fuel tank (39) and with an oxygen tank (128), and a second gasification chamber (227,326), which is in fluid communication with the liquid gas tank (28), the first gasification chamber (222,322) and the second gasification chamber (227,326) being under thermal exchange conditions for exchanging the combustion heat produced between the oxygen and the fuel.

44. (Currently amended) A generator according to Claim 43, ~~characterised in that wherein~~ the second gasification chamber (326) is directly inserted inside the first gasification chamber (322).

45. (New) An engine unit according to Claim 11, wherein the pump is a variable delivery pump used for controlling the engine speed.

46. (New) An engine unit according to Claim 12, wherein the pump is a variable delivery pump used for controlling the engine speed.

47. (New) A generator according to Claim 38, wherein the pump is a variable delivery pump for controlling the engine speed.

48. (New) A generator according to Claim 39, wherein the pump is a variable delivery pump for controlling the engine speed.